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BioSense and PHIN: Architecture Interoperability

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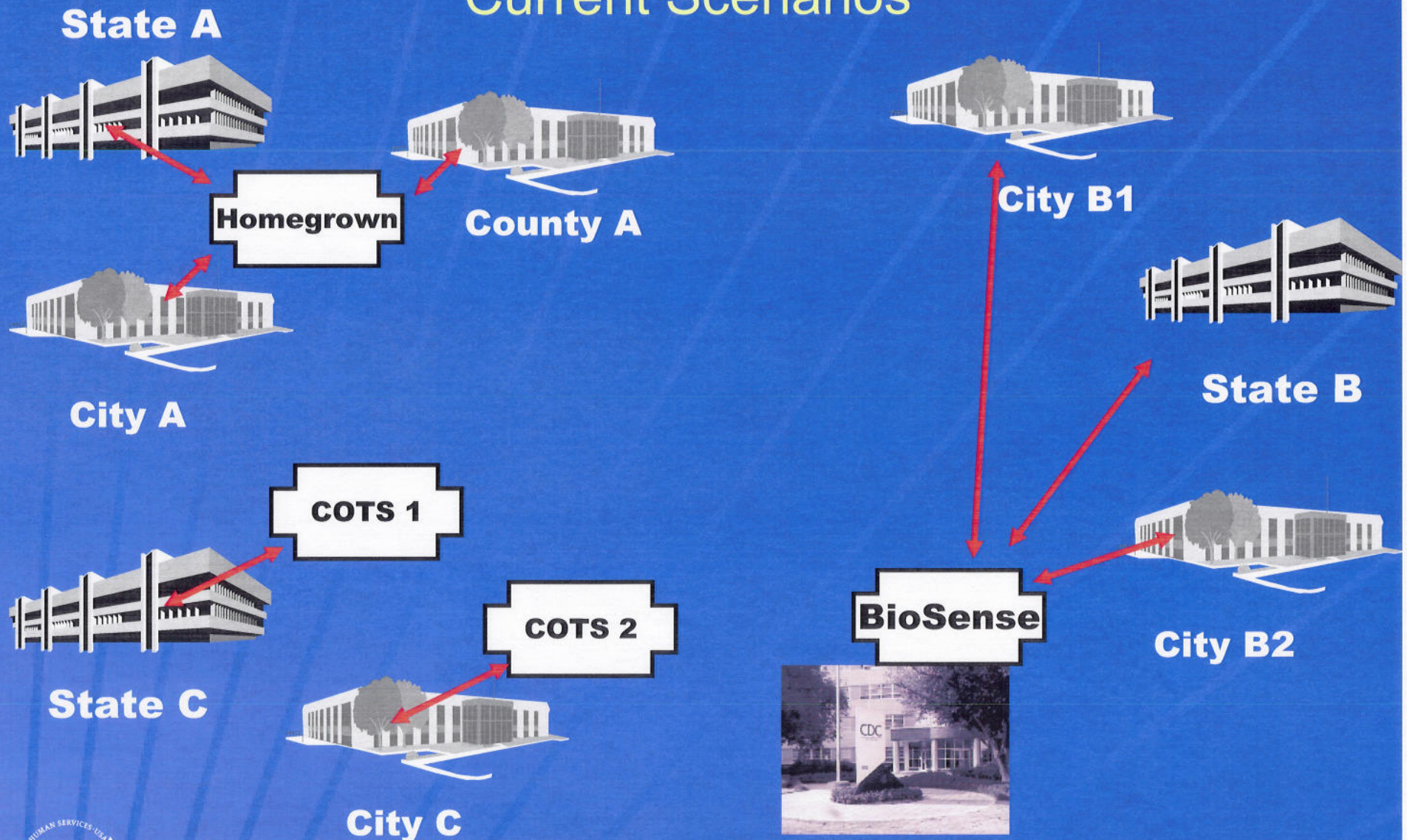
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Early Event Detection Systems

Current Scenarios

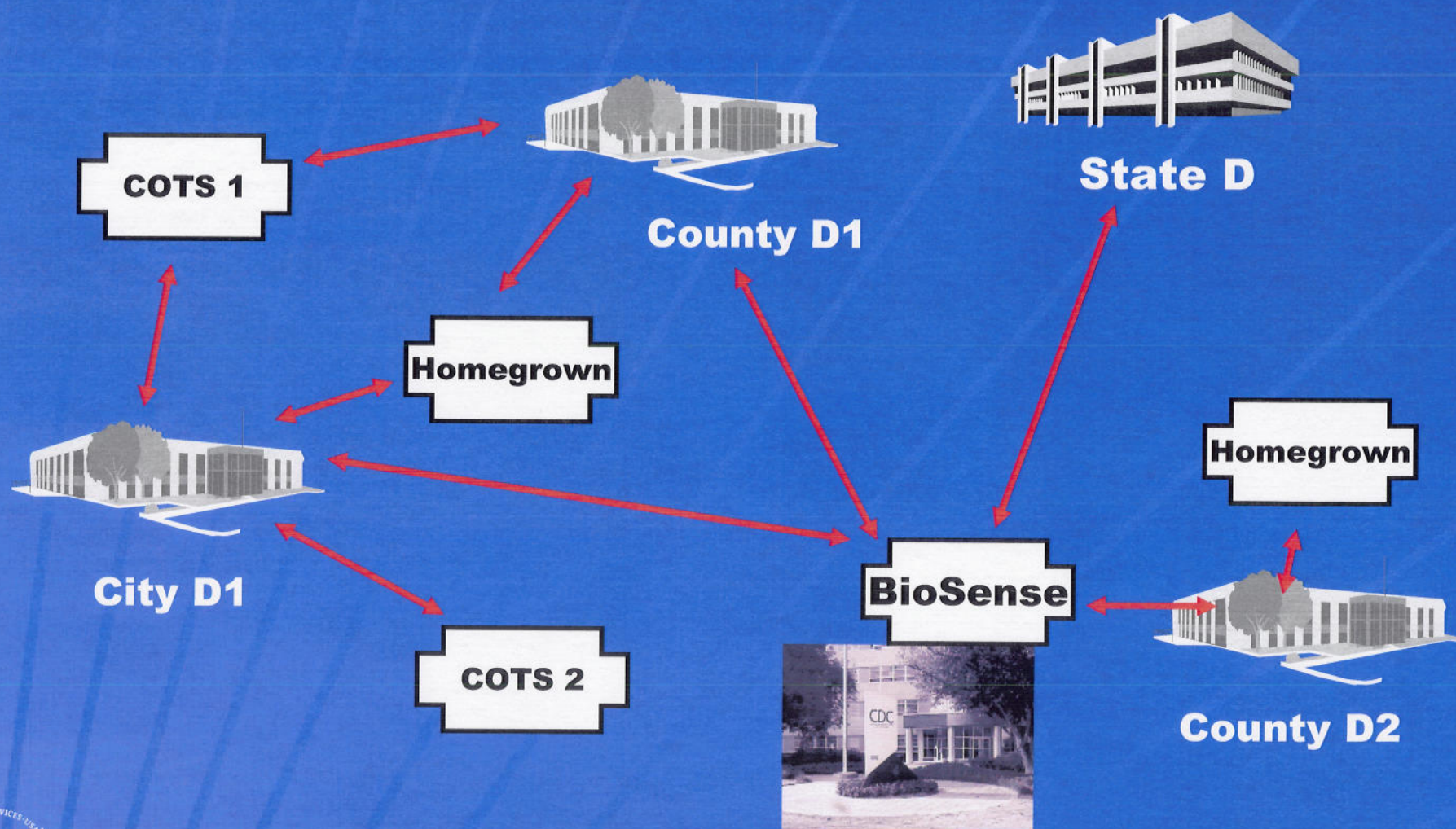


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Early Event Detection Systems

Current Scenarios



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The Problem...

Because public health outbreaks are not confined to:

- Single jurisdictions
- Single data sources
- Single patterns

Early Event Detection systems should:

- Share data sources
- Interact with outbreak response systems
- Facilitate collaboration for investigation



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BioSense and PHIN Interoperability

Interoperability: The ability of two or more systems or components to exchange information and *to use* the information that has been exchanged. [Institute of Electrical and Electronics Engineers. IEEE Standard Computer Dictionary: A Compilation of IEEE Standard Computer Glossaries. New York, NY: 1990]



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BioSense and PHIN Interoperability

PHIN Interoperability includes:

Information exchange between system components:

- Early Event Detection
- Outbreak Management System
- Notifiable Disease Systems

Information exchange between data “users”:

- CDC
- State Public Health Departments
- City/County Public Health Departments



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BioSense and PHIN Interoperability Overview

PHIN Early Event Detection (EED) Component

- EED requirements identified by state/local public health staff
- Relationships between PHIN Components
- Types of data utilized by PHIN components

BioSense as EED Component

- Recent application enhancements to better serve state/local users
- Future enhancements to facilitate interoperability

PHIN Enhancements for Increased Interoperability

- Data “provisioning”
- Additional PHIN components or activities



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Public Health Information Network

Early Event Detection
BioSense

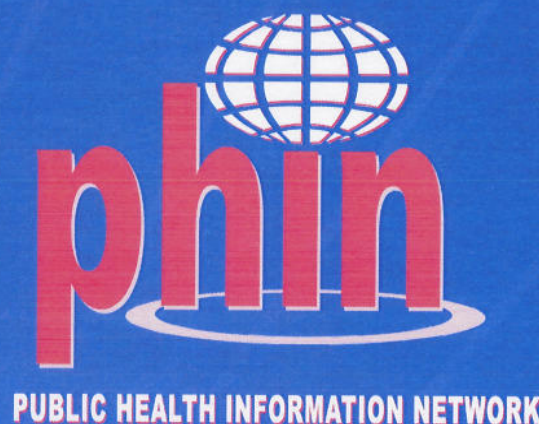
Surveillance
NEDSS

Secure
Communications
Epi-X

Analysis &
Interpretation
BioIntelligence
Analytic Technology

Information
Dissemination & KM
CDC Website
Health alerting

PH Response
Lab, Outbreak
Management, Vaccine
administration, etc.



Federal Health
Architecture &
Consolidated
Health Informatics



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BioSense and PHIN EED Specifications

Requirements Gathering Process

BioSense requirements gathered in consultations with state/local public health staff

- Initial requirements in Spring 2003
- On-going technical support with users

PHIN “Road Shows” - Regional workshops for state and local public health department staff

- EED sessions in Boston, Chicago, Portland OR, and Las Vegas
- Included input from COTS and “homegrown” system users

PHIN EED specifications intended to:

- Enhance existing systems
- Guidance for new development
- Certification specifications to promote interoperability



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PHIN EED Interoperability Requirements

State and Local Public Health Perspective

All Early Event Detection Systems should become more interoperable:

- With other PHIN Components
- With other EED or Syndromic Surveillance systems
- Across all levels of Public Health; Federal, State, and Local

Interoperability capabilities should include:

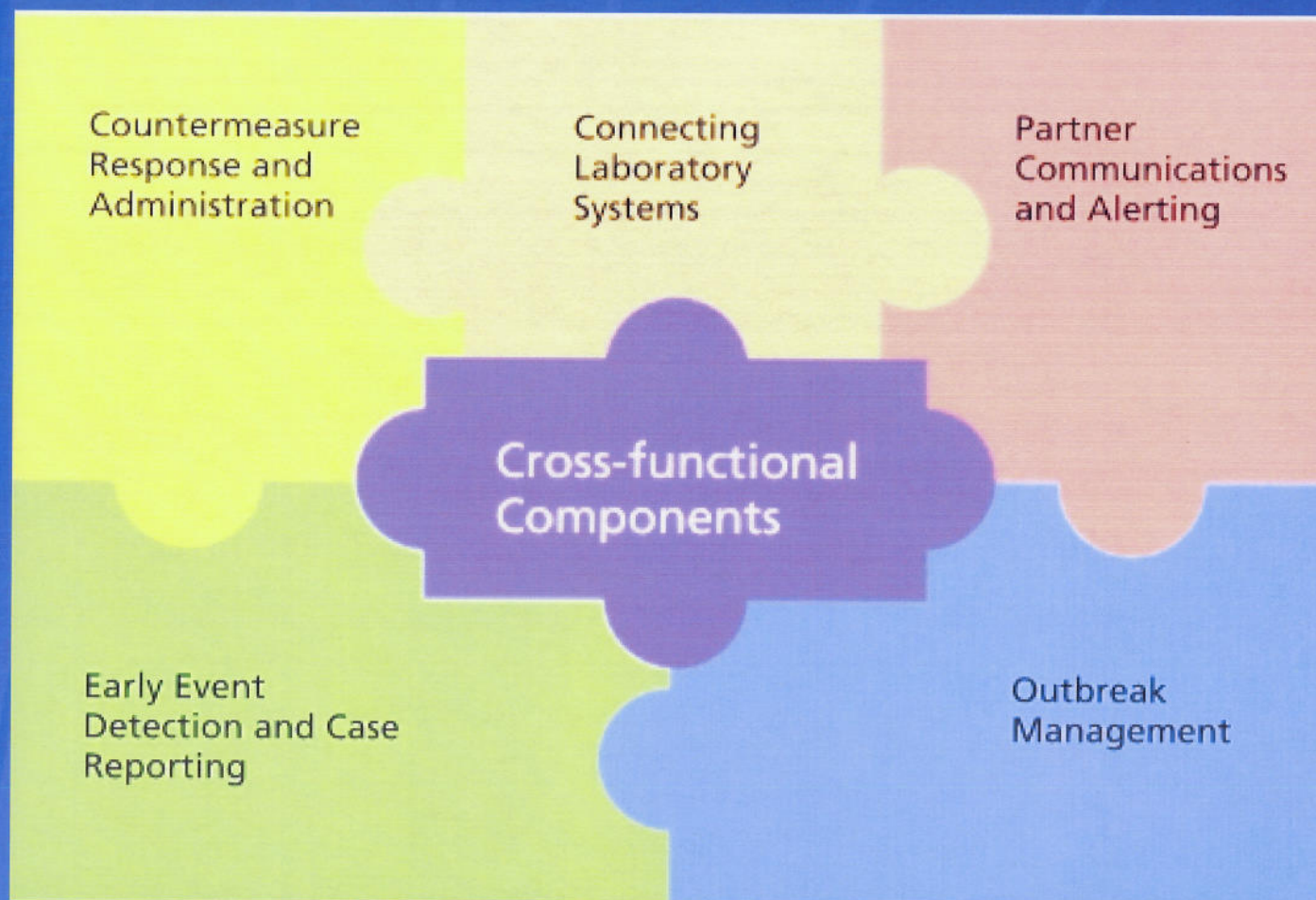
- Sharing of “raw” or source data
- Secure exchange of investigational information
- Technical support and access to resources



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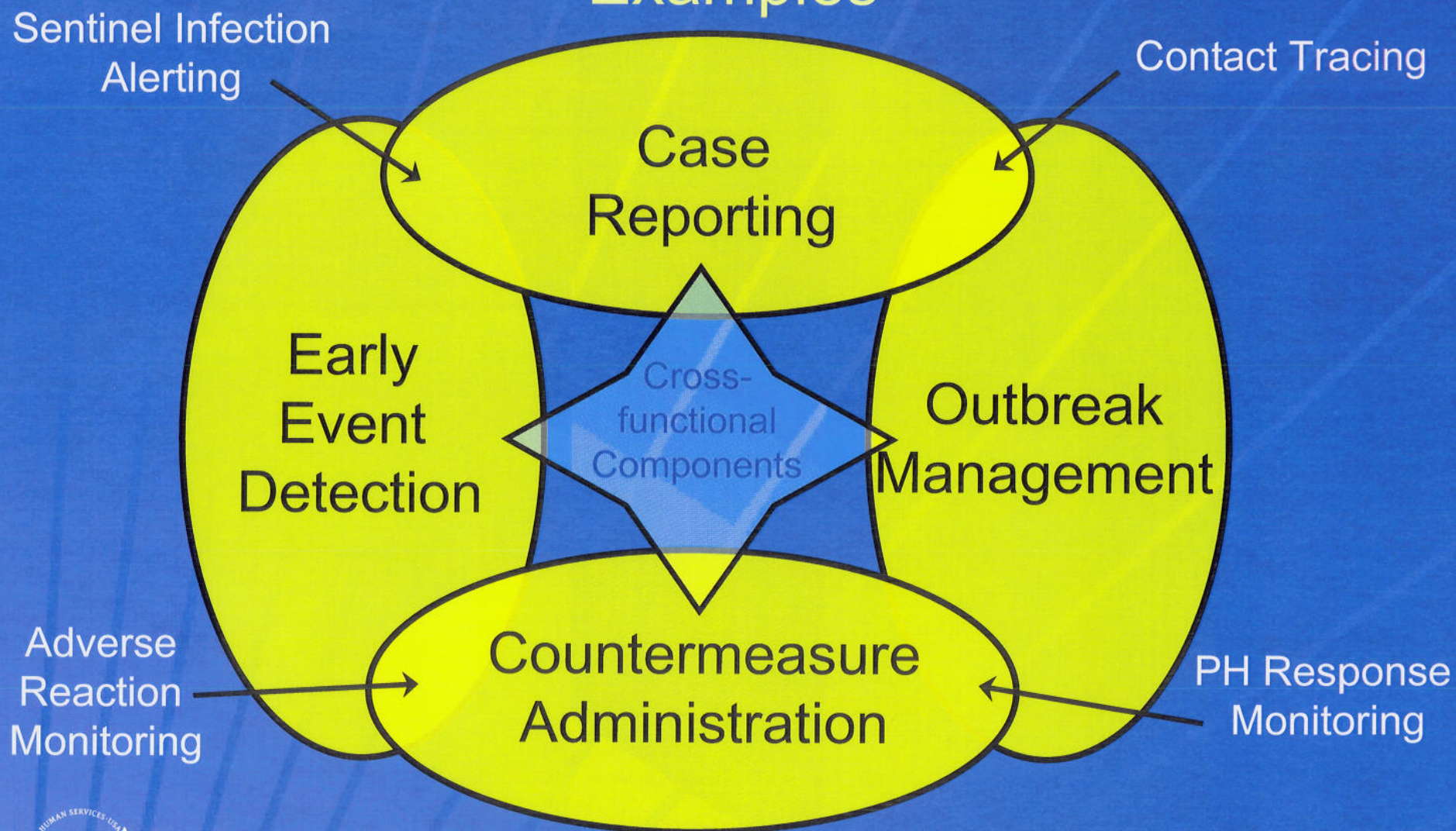
PHIN Component Concept Overview



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PHIN Component Interoperability Examples

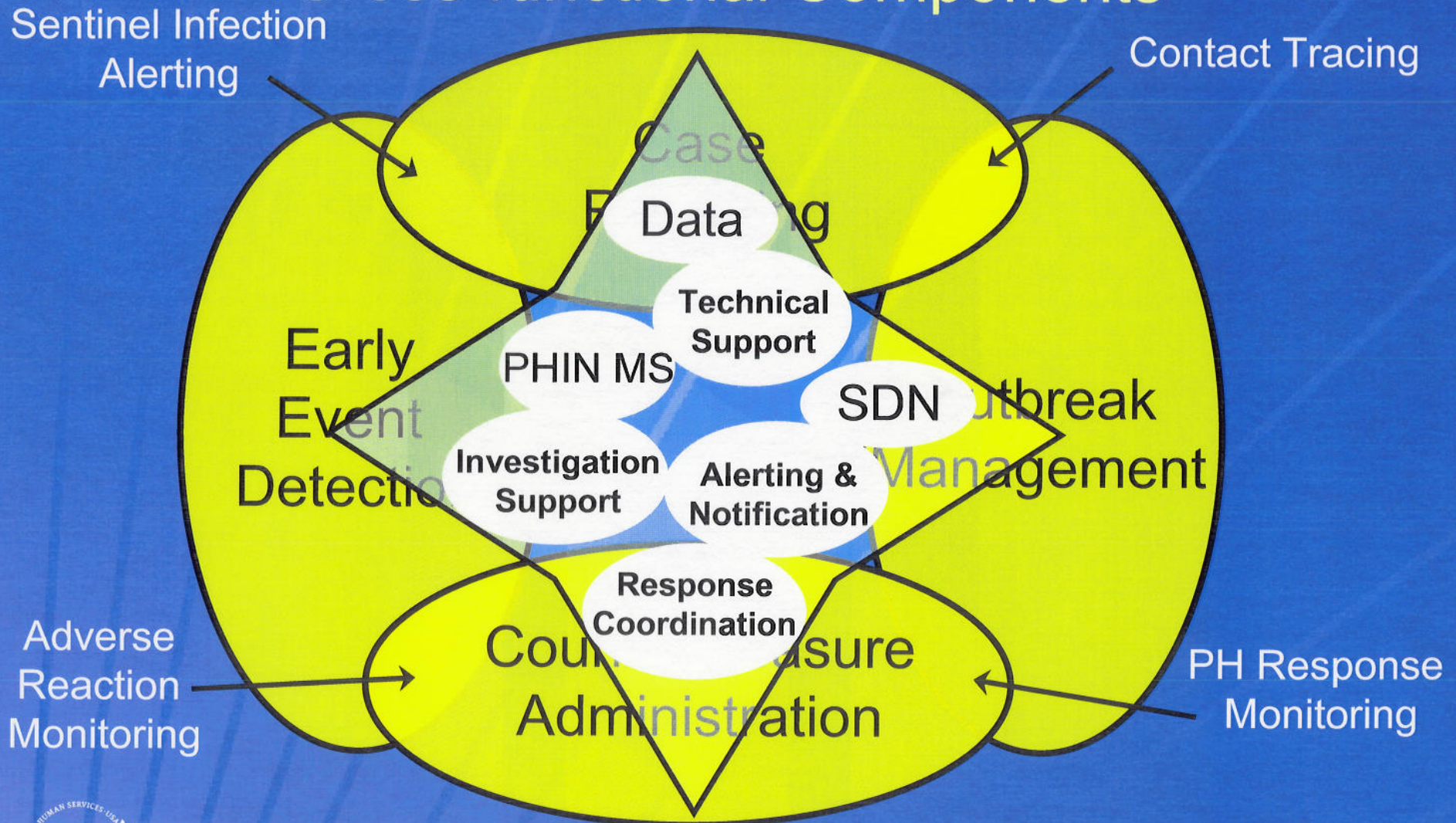


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PHIN Component Interoperability

Cross-functional Components



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PHIN Component Interoperability: Data Exchange or Sharing

Data Type	PHIN Component					
	EED	Suspect Case Reporting	NEDSS	OMS	CRA	LRN
"Secondary" Source Patient Data	✓	?	?	?		
Clinical Patient Report		✓	?	?	?	
Public Health Patient Report		✓	✓	✓	✓	
Environmental Monitoring	✓			?		✓
"Investigational" Sources	✓			?		



Intended Application



Potential Application

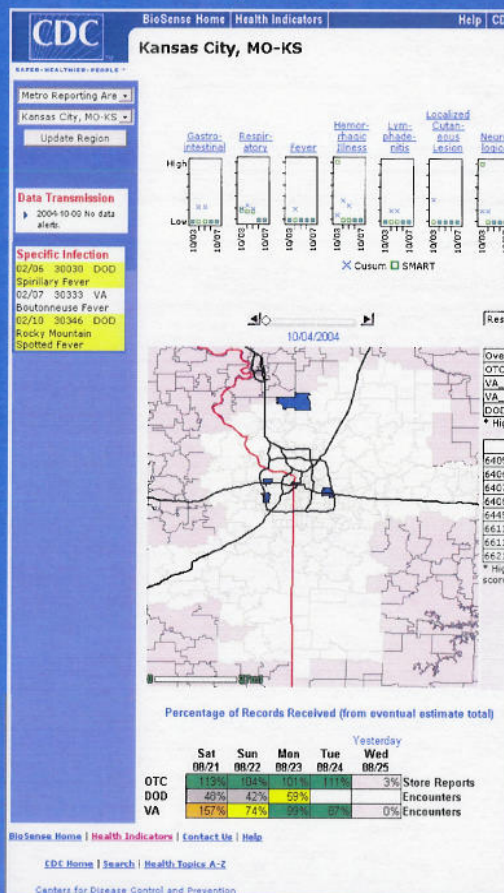


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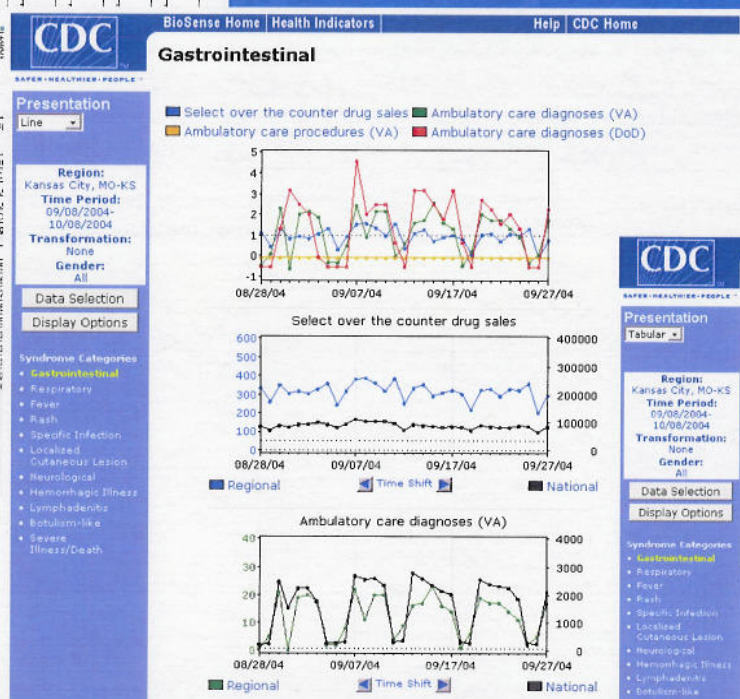
BioSense As EED Component

Analytical Results Pages



Near Real-Time Early Event Detection

Data Visualization Pages



User-Defined Options for Customizing Views

Gastrointestinal

	Select over the counter drug sales	Ambulatory care diagnoses (VA)	Ambulatory care diagnoses (DoB)
10/07/04	9	.	.
10/06/04	330	.	12
10/05/04	324	.	8
10/04/04	367	12	16
10/03/04	276	3	.
10/02/04	340	2	2
10/01/04	350	11	6
09/30/04	328	16	9
09/29/04	263	21	11
09/28/04	305	14	10
09/27/04	296	17	12
09/26/04	203	5	.
09/25/04	350	2	.
09/24/04	323	11	8
09/23/04	329	14	11
09/22/04	291	17	9
09/21/04	331	17	12
09/20/04	325	19	14
09/19/04	216	6	.
09/18/04	303	1	5
09/17/04	322	14	16
09/16/04	311	16	10
09/15/04	292	23	13
09/14/04	353	17	16
09/13/04	333	16	16
09/12/04	251	9	.
09/11/04	385	4	5
09/10/04	320	20	13
09/09/04	362	20	13

Consolidated Display of Multiple Analytical Techniques

Simultaneous Viewing of Multiple Data Sources



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BioSense Enhancements for 2005

Analytical Enhancements

- Refinement of current techniques
- Application of Spatial Scanning Technique

Data Visualization Enhancements

- Incorporated BioWatch viewer
- Data Source Users views

Public Health Users Support

- Sentinel Infection Alert Reports
- BioSense Users Working Group

Data Provisioning

- Acquisition of regional and local data sources
- Data distribution to State and Local Public Health EED systems



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Future BioSense Enhancements To Facilitate Interoperability

User-Defined settings to allow comparison to other EED systems:

- Custom syndrome binning
- Custom “region” setting
- Custom threshold setting for alerting

“Replay” capability

- Algorithm results history
- Rerun previous time period with “original” or “current” data



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PHIN Enhancements To Facilitate Interoperability

Enhanced data availability

- Data acquisition for enhanced EED coverage
- Data exchange between Public Health systems

Enhanced communications capabilities

- PHIN MS adaptation assistance
- Secure communications for information sharing

Enhanced data exchange between PHIN components

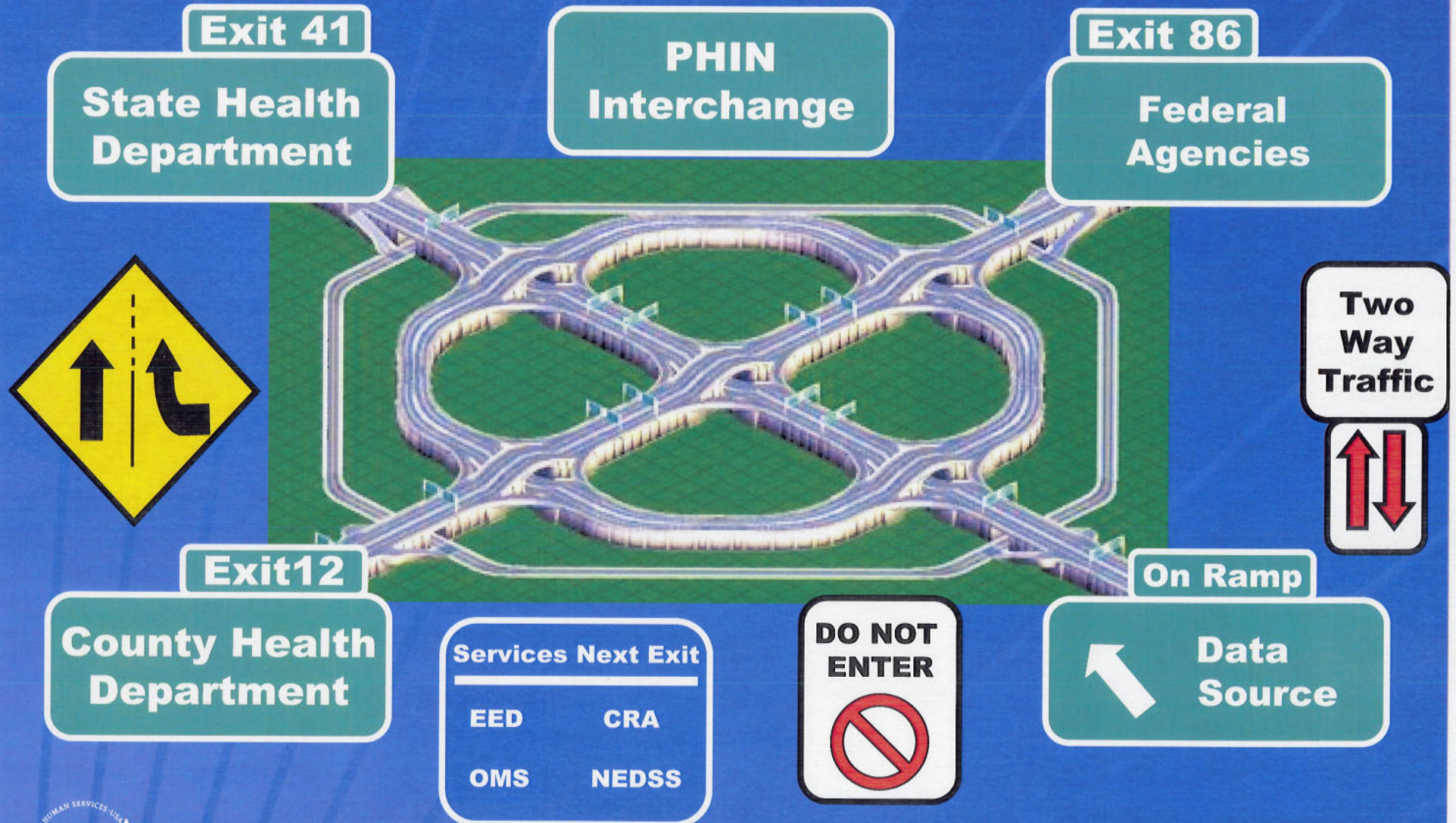
- Efficient utilization of “secondary” data
- Develop and enhance investigation and response activities



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PHIN Data Exchange



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PHIN EED “Secondary Data” Acquisition Issues to Promote Interoperability

Data source recruitment

- Identification and evaluation
- Data Use Agreement

Technical issues

- PHIN MS implementation
- Record selection interface

Analytical issues

- Data Quality monitoring
- Analysis and investigation support



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PHIN EED Data Provisioning Support Activities to Address Data Exchange Issues

Data Provisioning Collaboration

- Data source identification, evaluation, and recruitment
- State/Local Public Health Partner recruitment

PHIN Messaging IT development support

- PHIN MS adaptation assistance
- Data Sources
- Public Health Systems

Secure communications for information sharing

- Investigative reports and processes
- Peer-to-peer communications



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EED Investigation and Response Support Future PHIN Development

In order to support collaborative investigations, and enhance Public Health Response capabilities, PHIN EED “interoperability” advancements should include:

- Query-Back capabilities
- Investigational support database
- BioIntelligence Center Portal



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EED Investigation and Response Support Future PHIN Development

Query-Back Capability

Automated process through PHIN MS to send request to data source for more detail data on specific records.

User interface

- Identification of records and data elements
- Custom results viewer

Data architecture

- Validation before release to “partner” systems
- Interface with appropriate PHIN components (OMS, NEDSS, etc.)



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EED Investigation and Response Support Future PHIN Development

Investigational Support Database:

Provides for input of investigational findings by public health staff participating in a collaborative investigation or response.

Identifies and links records under investigation

- Across PHIN components
- Across data sources

Interfaces with external systems

- Generates “potential outbreak” summary record for Homeland Security NBIS system notification
- Interfaces with emergency operations center systems



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EED Investigation and Response Support Future PHIN Development

BioIntelligence Center Portal:

Web-based system to allow sharing of reports and access to non-PHIN systems through secure communication channels

Access to “external” information sources

- CDC-based historical surveillance systems
- “Newswire” services

Secure web site with detailed BioSense data

- Sensitive data source information
- EED system user contact information
- Custom reports produced for specific users
- Ad hoc query and analysis capabilities of PHIN data



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BioSense and PHIN Interoperability Summary

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- Input by state/local public health staff
- Define relationships between PHIN Components
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BioSense as EED Component

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PHIN Enhancements for Increased Interoperability

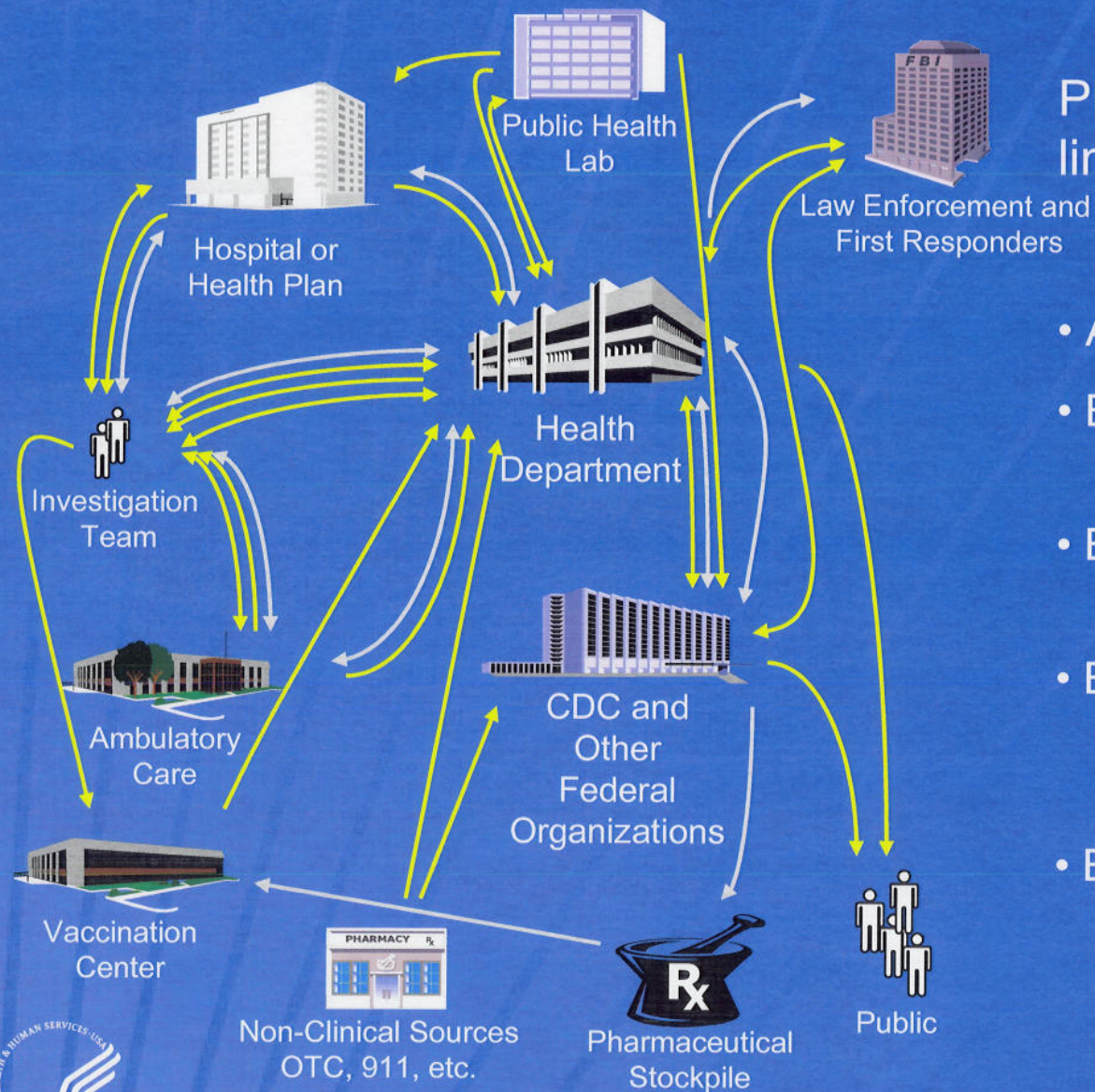
- Data acquisition and distribution
- Future development to support investigation and response



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Early Outbreak Detection Interoperability



PHIN Architecture provides linkages:

- Across levels of Public Health
- Between Operational Components
- Between Clinical Care and Public Health
- Between Human Health and animal, plant, and environmental health
- Between Health, Emergency Response, and Law Enforcement entities



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Acknowledgments

State and Local Public Health Departments

BioSense user community

Public Health Information Network project staff

EED and “Syndromic Surveillance” collaborators



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Additional EED or BioSense Information

BioSense material is available at
<http://www.cdc.gov/phn/.htm>

BioSenseHelp@cdc.gov

Technical support: 1-800-532-9929



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